

NASA Energy and Water Management Program

NASA's **vision** for energy and water management is simple:
Accomplish our mission using the minimum amount of **energy** and **water** required.

How Energy & Water Management Supports NASA's Mission

Energy and water are critical resources for NASA's mission success – every NASA facility, from flight simulators and wind tunnels to mission control centers and launch pads, requires both energy and water to operate. Major energy uses include...

- Research laboratories
- Wind tunnels
- Assembly facilities
- Data centers
- Launch pads
- Thermal vacuum chambers

Energy & Water in Numbers

13 Energy and Water managers

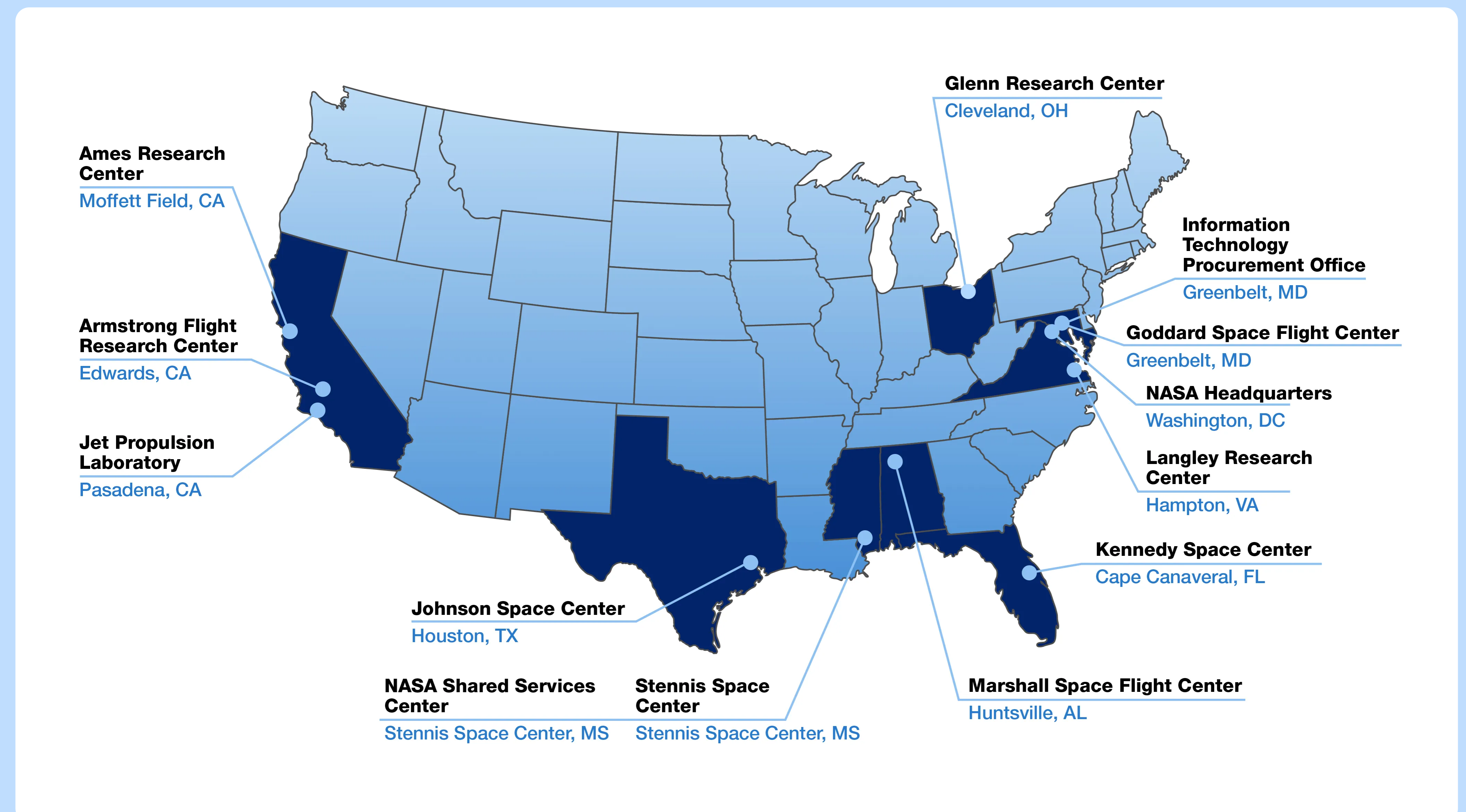
\$140M FY23 utility bill

\$22M Average annual cost avoidance over the past 10 years (in 2023 dollars)*

-13.1%
Total energy consumption reduction over the past 20 years

-2.7%
Total water consumption reduction over the past 20 years

NASA Centers & Facilities



* based on FY04 consumption

Impact of Federal Buildings

By the Numbers

The Federal Government is the largest energy consumer in the U.S., with **40% of its energy** consumed in buildings. Over **25% of Federal greenhouse gas (GHG) emissions** are from building-related fossil fuel use. NASA, which has the **9th largest portfolio** of Federal buildings, has a significant impact on the government's energy use and GHG emissions. NASA's portfolio includes...

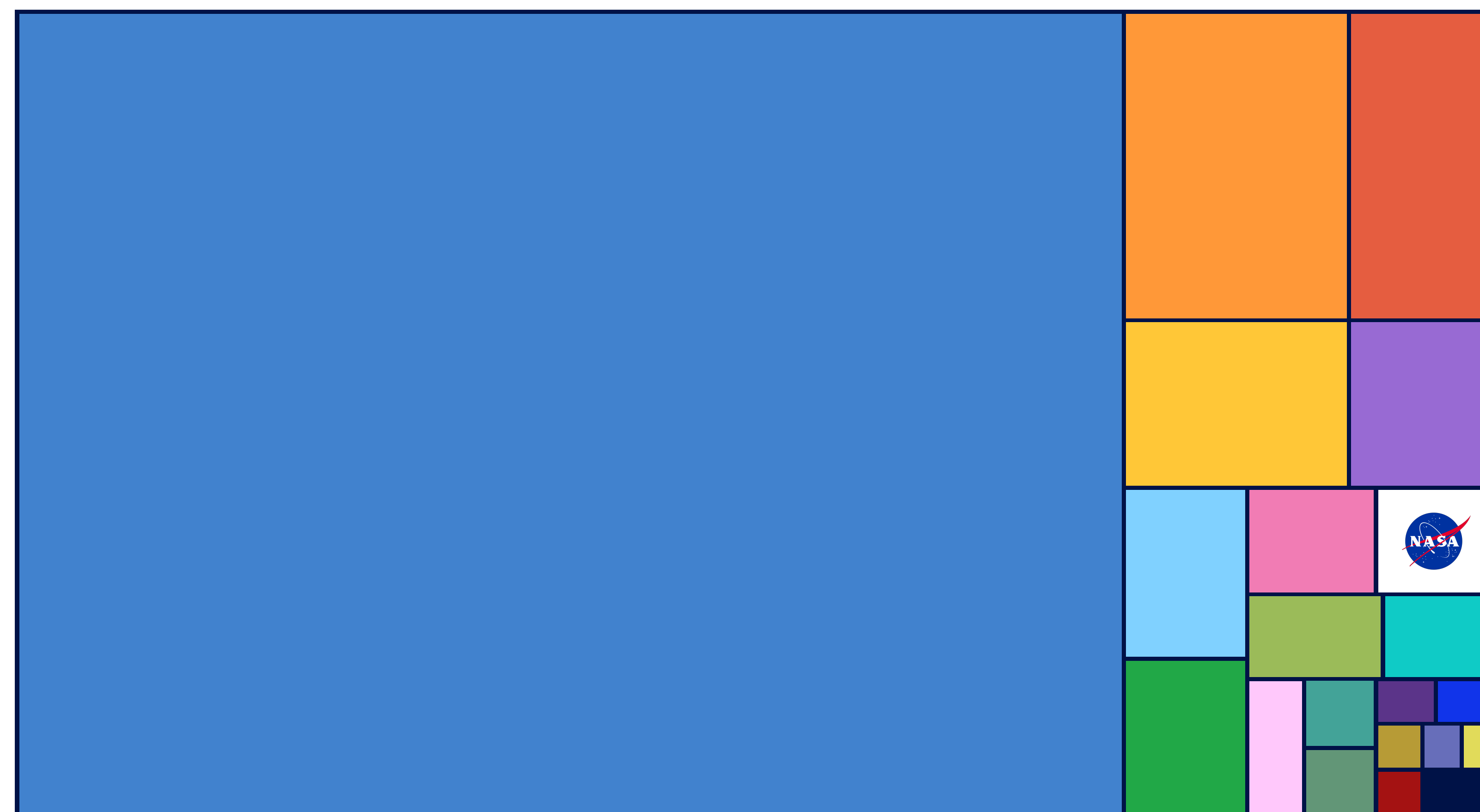
37M Square feet in over 2,200 buildings

54 High performance sustainable buildings

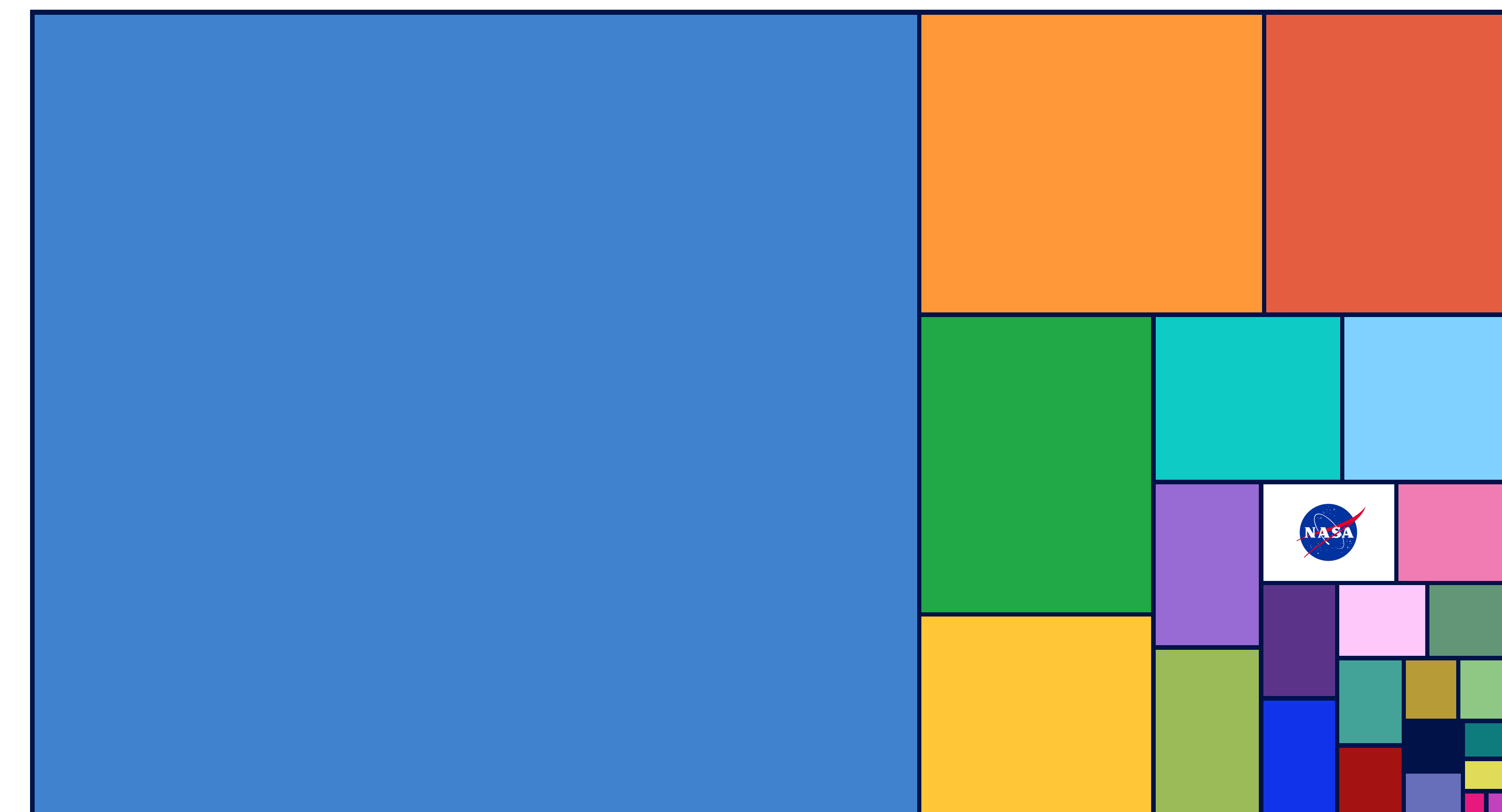
8TH Largest energy use

7TH Largest water use

Federal Energy Use Tree Map



Federal Water Use Tree Map



- | | | | | | | | |
|-------------|---------|-----|----------|-------|----------------|----------|------------------|
| Agriculture | Defense | EPA | HUD | Labor | Postal Service | SSA | TVA |
| Archives | DHS | GSA | Interior | NASA | Smithsonian | State | USACE |
| Commerce | Energy | HHS | Justice | OPM | Transportation | Treasury | Veterans Affairs |

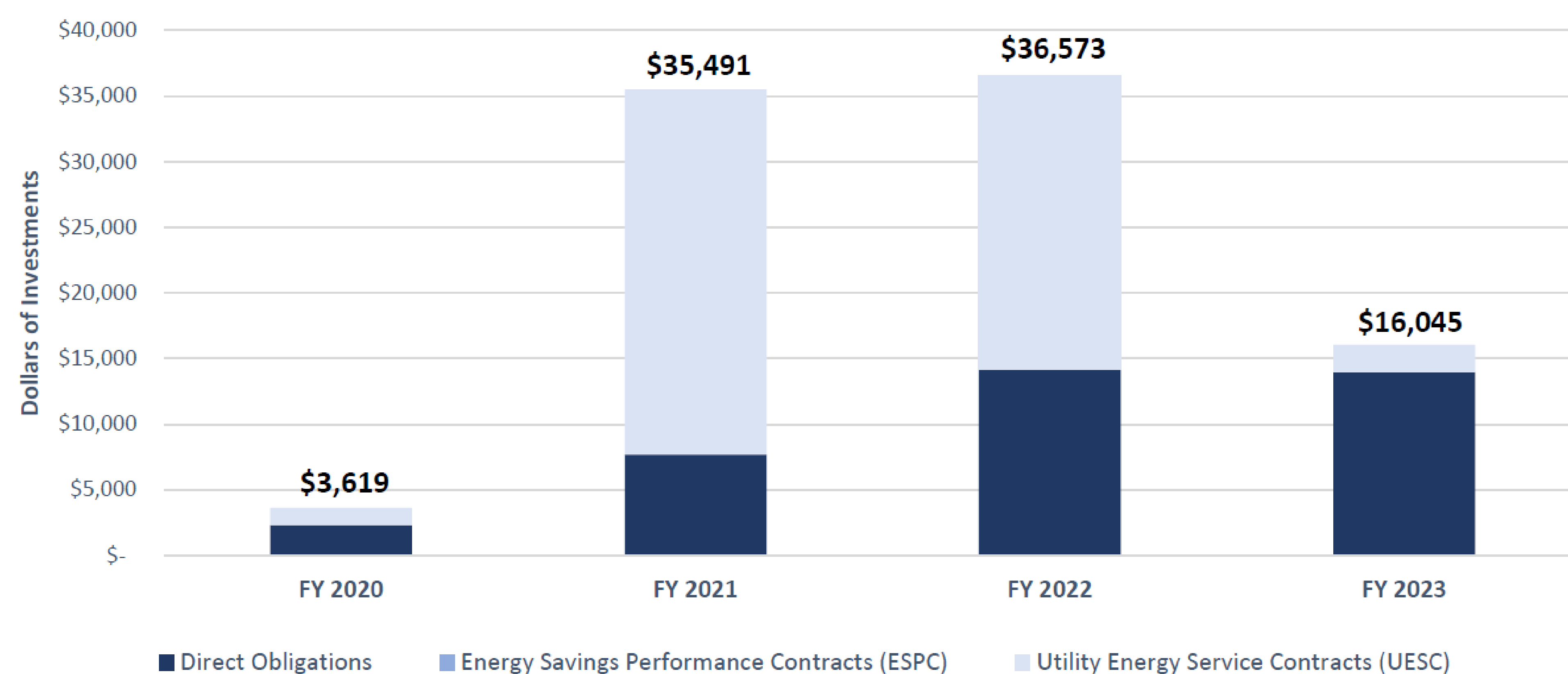
Efficiency and Sustainability in NASA Facilities

NASA's Office of Strategic Infrastructure invests in **energy** and **water affordability** and **sustainability**, ensuring that our facilities are constructed and operated as efficiently as possible to minimize our resource consumption and climate impact.

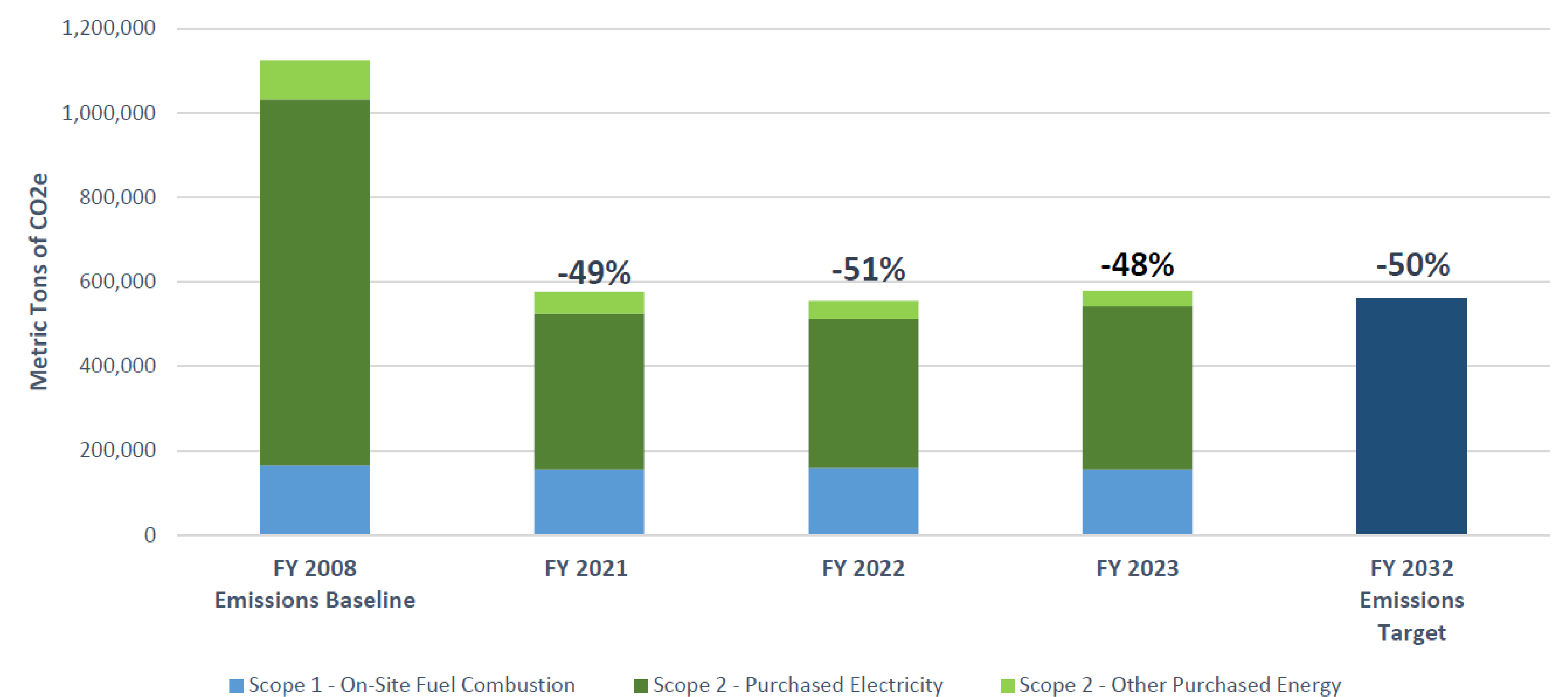
Sustainability Investments

NASA has averaged approximately **\$25 million** per year in investments over the last 5 years, leveraging a mix of direct appropriated funding, enhanced use lease net revenue, and third-party financing. Thanks to these energy and water investments, as well as new sustainable building construction (and demolition of old, inefficient facilities), and Center operation and maintenance programs, NASA uses less energy and water, reduces utility costs, and minimizes GHG emissions to accomplish its mission.

Investment in Energy Efficiency and Renewable Energy
(in As-Spent Dollars (Thou.))



GHG Emissions from Standard Operations in Facilities
Reduction in annual scope 1 and 2 emissions (MT CO₂e) from a FY 2008 Baseline



NASA Energy/Water Consumption/Cost

In **FY23**, NASA consumed **7,434 billion Btus** of **energy** at a cost of **\$127 million**. Utilities account for approximately **20-25%** of the Agency's facilities service expenses. However, through effective energy and water stewardship, NASA has substantially reduced both its utility costs and overall consumption.

Overview

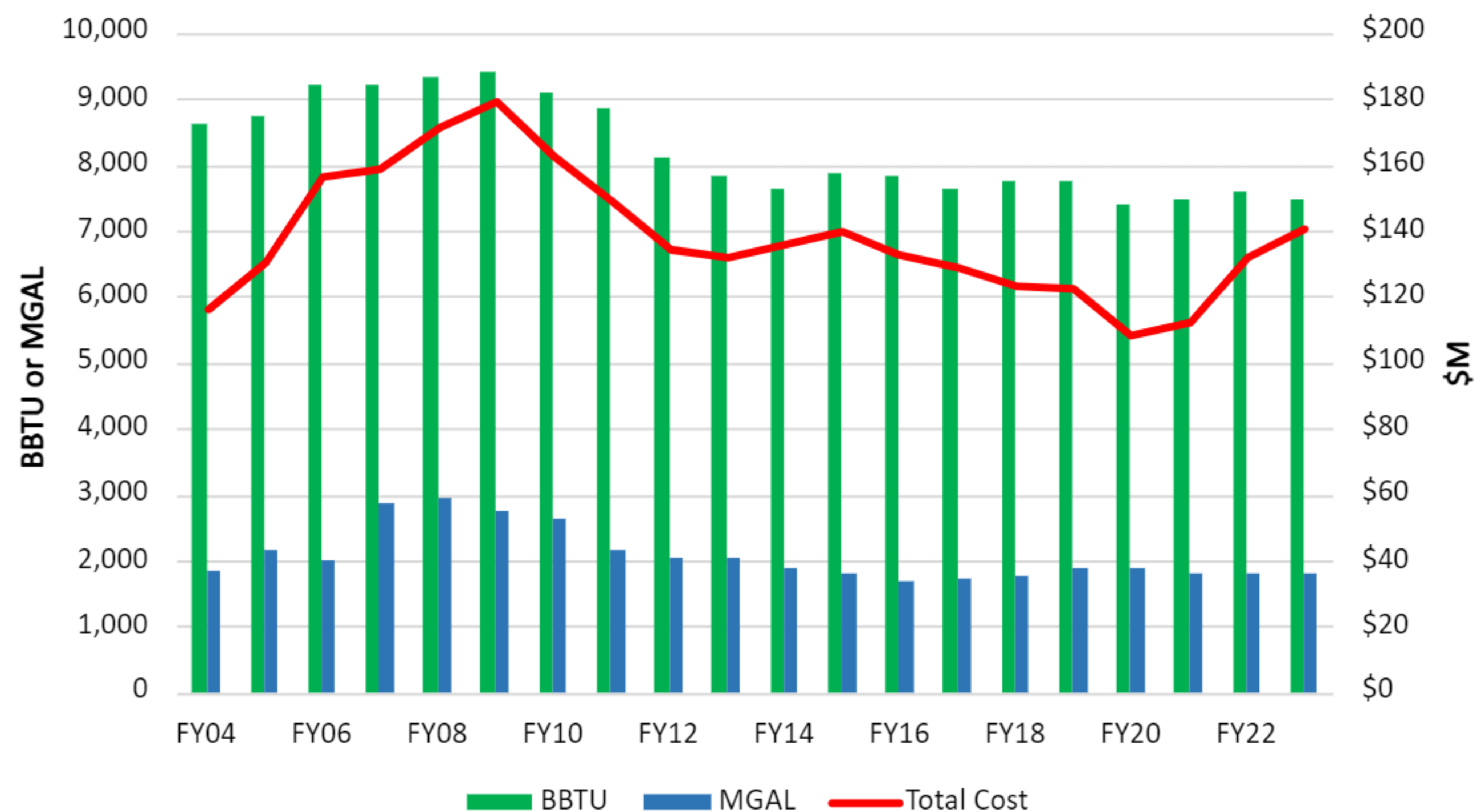
The 5-year average annual cost for facilities energy and water at NASA is **\$123 million**. When comparing energy and water consumption and costs in **FY23** to **FY22**, statistics show a...

↓ **-1%** Energy and water consumption decrease

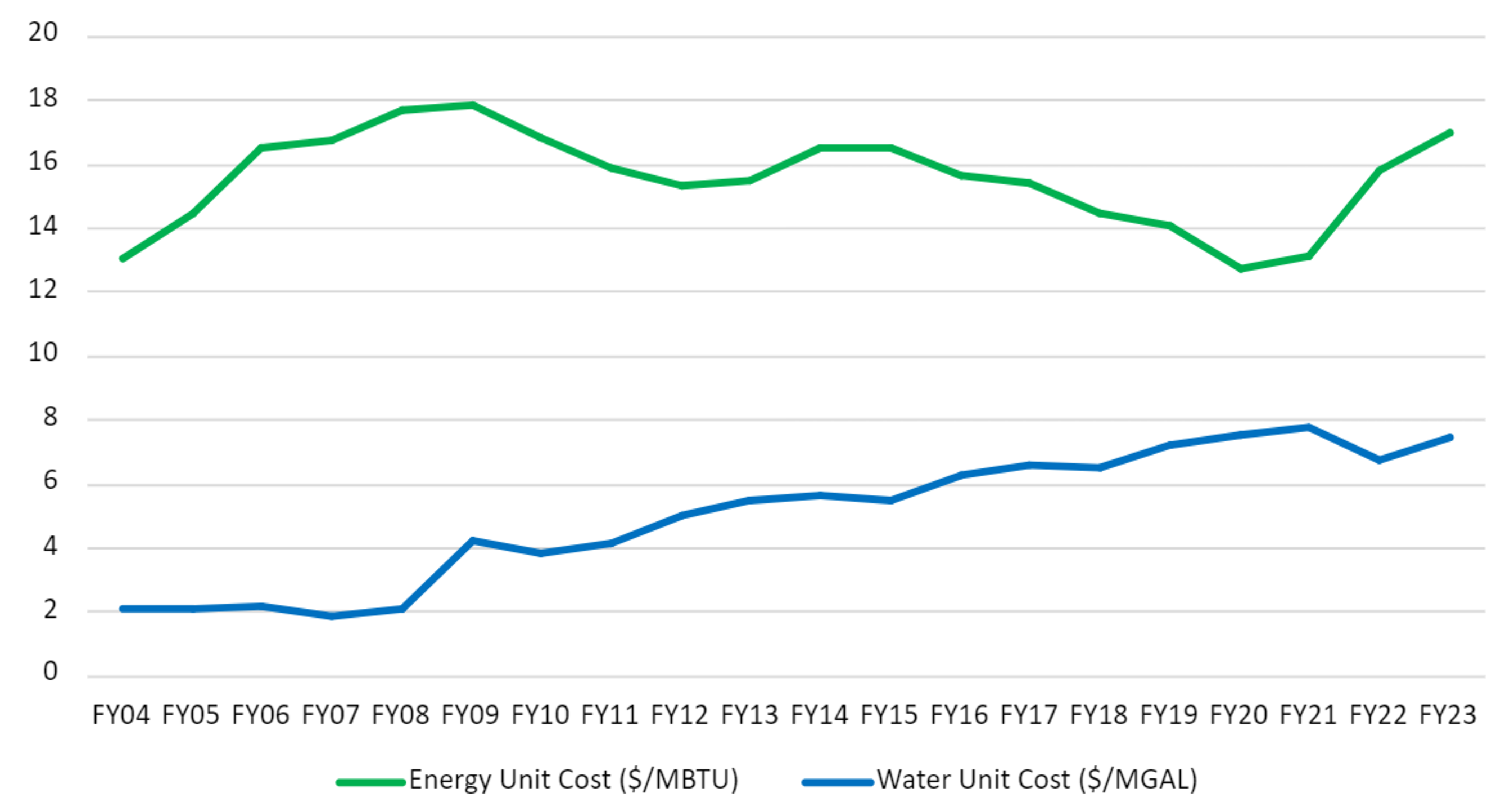
↑ **\$7.5M** Energy cost increase (6%)

↑ **\$1.5M** Water cost increase (9%)

NASA Utility Consumption and Cost



Utility Unit Cost



Project Awards

Goddard Space Flight Center

GSFC Existing Building Commissioning Program

Federal Energy and Water Management Award — Project Award

Awardees: Evelyn Baskin, Ernest Wayne Phillips, Sarah Austin-Blevins, Andrew Komm, Sherry McCray



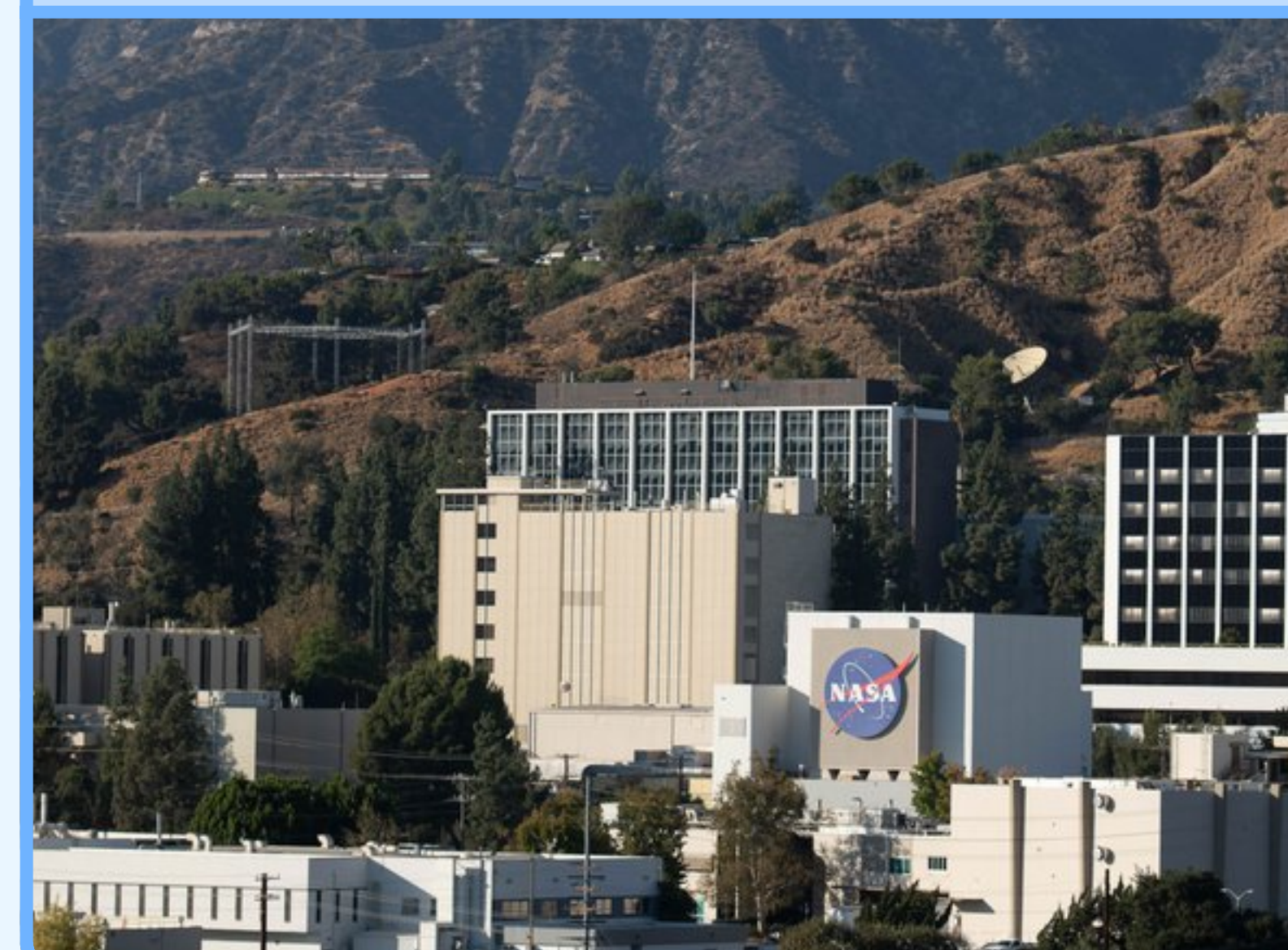
The Goddard Space Flight Center (GSFC) Energy Team implemented an Existing Building Commissioning/Retro-commissioning project in four of its highest energy-consuming buildings improving equipment serving 640,456 square feet.

Jet Propulsion Laboratory

JPL Data Center Consolidation Project

Federal Energy and Water Management Award — Project Award

Awardees: Marcus Watkins, Jose Floers, Amanda Hezel, Galen Brown, Scott Trotier



In October 2020, Jet Propulsion Laboratory (JPL) completed the implementation of a landmark data center resilience, consolidation, and efficiency project. NASA leveraged an Energy Savings Performance Contract to implement the project.

Glenn Research Center

GRC Energy Savings Project

Federal Energy and Water Management Award — Project Award

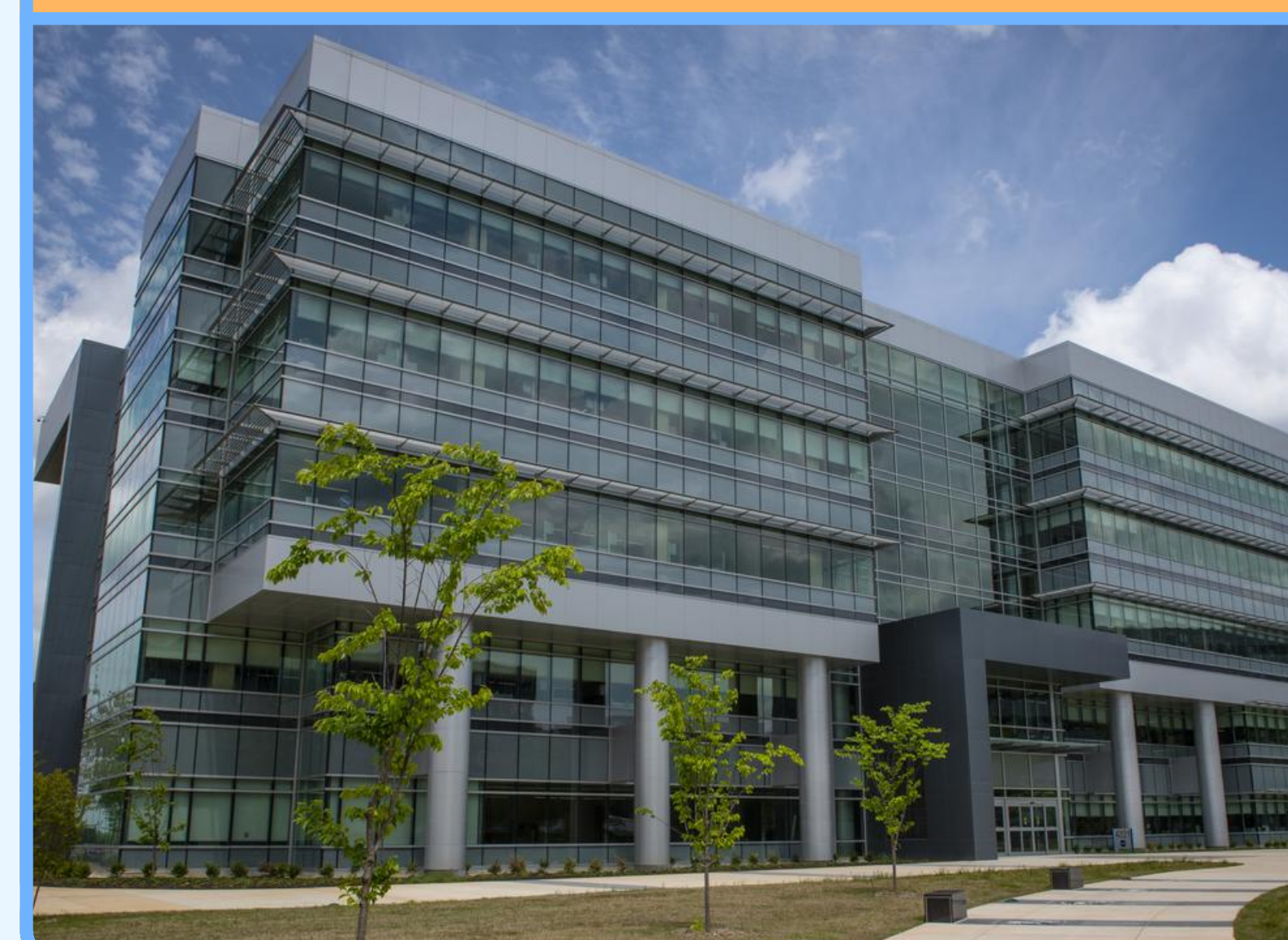


Glenn Research Center implemented a \$14.8 million energy savings performance contract that includes nine energy and water conservation measures at Lewis Field and Armstrong Test Facility.

Marshall Space Flight Center

MSFC Building 4221

Green Globes Project of the Year



This Marshall Space Flight Center (MSFC) project earned Project of the Year designation for its innovative and thoughtful sustainability achievements, implemented early in design by a robust integrated design process.

Kennedy Space Center

KSC Central Campus Headquarters Building

FEDS Spotlight

Awardees: Scott Hunt



Scott Hunt's leadership in sustainable building design led to the achievement of Leadership in Energy and Environmental Design Platinum certification of Kennedy Space Center's (KSC) newly constructed Central Campus Headquarters Phase 1 Building.

Kennedy Space Center

KSC Enhanced-Use Lease Agreement with FPL

FEDS Spotlight

Awardees: Nicholas Murdock



Nicholas Murdock led a multidisciplinary team to successfully develop an enhanced-use lease agreement that enabled KSC to host a Florida Power and Light 74.5 MW utility-scale solar photovoltaic system expansion, significantly assisting NASA in meeting its renewable energy goals.

Marshall Space Flight Center

MSFC Water Leak Detection and Advanced Metering Infrastructure Project

Federal Energy and Water Management Award — Project Award

Awardees: Rhonda Truit, William Berry, Brent Garber, Clark Lowery



MSFC initiated six pilot projects, including water leak detection and advanced metering infrastructure, aimed at foundational infrastructure enhancements for operational efficiency, energy and water conservation, safety risk reduction, and future capability improvements.

White Sands Test Facility

WSTF Solar PV Project

FEDS Spotlight

Awardees: Albino Hernandez, Juan Tiscareno, Chris Wolf



This White Sands Test Facility (WSTF) project team developed and built a pioneering 1.64 MW solar photovoltaic system, providing WSTF with enhanced energy security and resiliency. The system includes lightning protection and a hurricane rated self-ballasting racking system and hardware.

Marshall Space Flight Center

MSFC Flexible Workplace Initiative

Federal Energy and Water Management Award — Project Award



In FY 2019, MSFC developed and implemented a plan to utilize the first Friday of the pay period as a Flex Work Day (FWD) across MSFC, saving more than \$460,000 in energy expenditures. The FWD program was so successful it was re-instated when MSFC employees returned to the Center after the COVID-19 pandemic.

Kennedy Space Center

KSC Utility Energy Services Contract

Federal Energy and Water Management Award — Contracting Award

Awardees: Cory Taylor, Jennifer Hill, Karen Rivaud, Nathan Bickel, Matthew Pomeroy



In July of 2021, the KSC Utility Energy Services Contract (UESC) Phase 1 team completed a four-year-long effort to award a \$19.4 million UESC to Florida Power and Light.

Other Notable Projects

View all project awards at bit.ly/EWMP-Awards

Langley Research Center

Flight Dynamics Research Facility



This versatile, cost-effective vertical wind tunnel for flight-dynamics research is scheduled for completion in 2025. It has projected reductions of ~40% in energy usage and ~80% maintenance costs, relative to existing facilities. The project also enables the demolition of 33,000 square feet of flood-prone NASA facilities.

Langley Research Center

Building Retuning



Building retuning is a systemized process to find and correct facility operational issues or opportunities to improve performance and decrease energy and water waste, primarily focused on Building Automation System changes. The estimated annual savings from these low- to no-cost initiatives total over \$75,000.


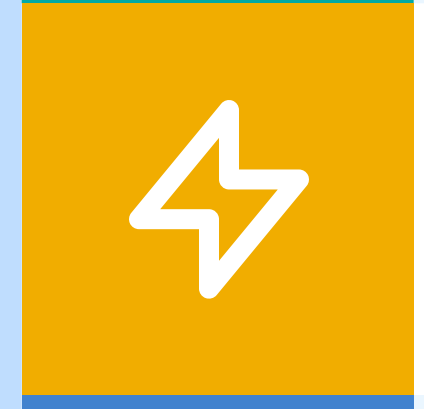



What's Next for EWMP?

NASA's **HQ** and **Center energy management teams** are always working to **support NASA's missions** by minimizing the utility cost of those missions and by improving the efficiency and performance of the facilities critical to those missions.



NASA E/W Efficiency Panel

Some of the upcoming work for these teams include the following projects/initiatives:

-  Continue implementing \$16M FY23 investment in energy projects
-  Implement \$36.6M in planned energy investments
-  Conduct resilience assessments at SSC and MAF (these assessments have already been completed at 7 Centers)
-  Begin development of automated utility invoicing/utility metering software
-  Begin modernizing NASA's energy/water data integration and analytics capabilities